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Journal of the Society of Arts.

FRIDAY, APRIL 11, 1856.

SEVENTEENTH ORDINARY MEETING,

WEDNESDAY, APRIL, 9, 1856.

The Seventeenth Ordinary Meeting of the One Hundred and Second Session was held on Wednesday, the 9th inst., T. Dunn, Esq., Local Commissioner (Sheffield) for the International Exhibitions of 1851 and 1855, in the Chair.

The following Candidates were balloted for, and duly elected Ordinary Members:—

Dunn, Thomas.	Healey, Edward Charles.
Jones, Thomas Stead.	Radford, William, M.D.

The paper read was—

ON THE MANUFACTURE OF ARTICLES FROM STEEL, PARTICULARLY CUTLERY.

By JAMES WILSON.

The causes that have fixed the seats of our principal manufactures would form an interesting subject of inquiry. In many instances the particular minerals or earths of a district may determine its manufactures. But this is not invariably the case, for modern systems of transport have more equally balanced the facilities of all localities. Where, however, a trade has been established for centuries, its origin may be generally traced to some peculiarity of the district. Thus we find the manufacture of iron first takes place in those situations where iron-stone and fuel for smelting are in convenient proximity. This, I have no doubt, was the case in the neighbourhood of Sheffield. There are places within a few miles of that town where the Romans have left evidences of their industry and their arts. To the iron, coal, clay, stone, and water power of Sheffield and its neighbourhood, we may clearly trace the origin of its metallic productions. But it is not the object of the present paper to enter into the history of those manufactures, however interesting such a subject might be. The extent to which they are carried at the present time indicates, in a marked degree, the progress of civilisation and refinement. The value of our exports in cutlery and hardware shows that they form a considerable portion of our national industry. As, however, it is asserted that the manufacture of articles from steel is on the decline in this country, and that, as a nation, we are already behind several continental nations, it becomes us calmly to see how far these statements are capable of proof, and to estimate what our capabilities really are. I have no hesitation in saying that the best class of cutlery is of a superior character altogether to the productions of any previous time; and for these reasons. We have material as good as ever to work upon; we have workmen as skilful as the artisans of any preceding age; we have better designs to work from, and the chemistry of metals is better understood, though still, perhaps, not sufficiently appreciated.

In order to render the subject clear, it may be desirable to explain that by the term cutlery, I mean any article manufactured from iron or steel, or both, for cutting purposes. I am aware that such a definition would exclude many articles which, as well as knives and razors, require good material and nicety of workmanship. It will conduce to simplicity to exclude from our minds everything but the essential property of the article. Thus, in speaking of a knife, I simply mean the blade, when not otherwise ex-

pressed. Thus a blade, if merely fastened to a piece of wood, is as much a knife as if connected with a handle of pearl. If we consider the properties of a good blade, they will be found to be, hardness, or temper, elasticity, and capability of "holding an edge" equal to the performance of the proper work for which it is designed. Many people, however, have curious ideas of the capability of a blade, and would use a penknife as they would a bill-hook, or expect in a razor the property of an oyster-knife. We must here suppose that each article is used for its proper purpose.

I am not aware how far the proper angle of edges may have been investigated, but I think the cutting angle of a good razor or penknife will be from fifteen to twenty-five degrees. In scissors, however, there is a great difference, as the cutting power is a combination of perpendicular and lateral pressure. The cutting angle is that which will give the greatest strength compatible with sharpness. This will be an angle of about 80 degrees, which affords sufficient strength to prevent "snipping," and sufficient sharpness to answer the purpose for which it is intended. Should the edge exceed a right angle, it would lose sharpness according to the increase in the angle. For "edge tools," or joiners' tools, no fixed rule can be given. From the variety of instruments, and their equally varied uses, it is impossible to adhere to any given rule.

I shall now proceed to show how articles of cutlery are manufactured, so as to possess those properties which should characterise them. It has been affirmed that we possess as good material as ever for the making of cutlery, namely, steel, and I am assured by experienced steel refiners that, when required and paid for, steel can be made of the greatest excellence, though much of a bad quality is manufactured for the production of cheap goods. The steel, as prepared for cutlery purposes, is tilted or rolled to different sizes suited to the articles intended to be produced. This will be best understood by inspecting the specimens on the table. To ensure the necessary degree of hardness, the steel should be compact and dense. It is not considered desirable to use new steel. The reason is not very evident, but it is known from experience that steel works "more kindly" after being kept some time. It is only the makers of first-class cutlery who attend to this, because, to keep a large quantity of steel in stock seems like so much idle capital, though it is necessary in order to obtain the best results. Instead of keeping it in this manner, it is common to use inferior steel, which is easier to work, thus economising labour and favouring cheapness of production. Another reason for the employment of softer steel is, that it is less liable to waste from cracks or fracture, as will be afterwards explained. The forging of articles from steel is much the same in all cases, except that smaller articles are forged single-handed, and the larger ones by double-handed forgers. Thus pen-blades, small scissors, &c., are forged by one man; table blades, razors, edge-tools, &c., by two men—a maker and a striker. The maker attends more especially to the form, while the striker, using a heavier hammer, "draws out" the blade from the rod of steel. It requires several "heats" to complete the forging of a blade, as may be seen from the specimens. Small articles of cutlery are mostly made entirely of steel, but the shanks and bows of scissors of large size, and the bolsters and tangs of table cutlery, are of iron. This is done for the double purpose of economising steel and facilitating the labours of those who work after the forgers. The two metals are welded together in a very simple manner. The burning point of steel is much lower than that of iron, and the quality of the steel would be destroyed by heating to incandescence. But iron may be heated to near the melting point without injury. When both are heated to the required degree, they are slightly dipped in a flux, consisting of borax or siliceous sand, and then hammered together. The junction is nearly always visible upon the reverse of table knives, the iron, not being capable of so high a finish as the steel, appears of a

lighter colour. There is one advantage in this appearance. It is a sure indication that the articles have been forged, and not cast. It gives, however, no proof of the quality of the steel. When the forging is completed, the maker's name is struck upon the blade, as well as any other distinguishing mark that may be desired. The blades are then hardened by heating to a red heat, and immersing in water. If the steel be good, it becomes excessively hard and brittle, but its temper and elasticity are given by again submitting it to a moderate degree of heat, which a skilful workman can regulate by watching the changing colour of the steel. This will show the reasons for making the bolsters of table cutlery, &c., of iron. The latter metal is not hardened by the above process, so that the bolsters of table-knives, and bows and shanks of scissors, can be filed and burnished, or "dressed," by any other process, while the blades are so hard as to resist the operation of a file. The process of hardening is so important that it will not, perhaps, be deemed tedious if I offer a few remarks upon it, especially as it will show the importance of a good feeling between employer and employed. I have already stated that soft steel is less liable to waste from cracks or fracture. The process of hardening is so delicate, that a slight difference of heat in excess, either in the fire or water, destroys the quality of the steel, or cracks the blades. Cold is equally, if not more, destructive, and blades are said to be "burnt," "scalded," or "water-cracked," as the case may be. In forging, too, if the steel be heated too much, its close texture is destroyed, and it has more the appearance of the coarse crystallization of iron, as may be seen in the specimens. Where men are not adequately paid for their labour, there is every temptation to produce quantity without regard to quality, and as steel is softer and easier to work at a high temperature, a man has little care whether he spoils his material or not. Discovery is not certain, and least certain as the steel approaches the nature of iron. The burning point of steel is much lower than that of iron, so that where men have no respect for their employers, it is easy for them to do injury with impunity; but where men are adequately paid for their labour, they generally have regard to the reputation of their productions, and work conscientiously for their employers. It will be seen from this how important it is that a good understanding and kindly feeling should exist between employers and employed. If the conditions here stated be complied with, there is no doubt of the quality of the articles, so far as the process of manufacture is concerned.

The next process is "grinding." The stones of some parts of South Yorkshire are particularly adapted for this purpose. They are formed at the quarries, of a round shape, like a cheese, and of various sizes. Stones for grinding table knives are about 4 ft. diameter, and 10 in. in thickness. To prepare them for running, a hole is made through the centre, in which is inserted the axle. Formerly the stones were fixed upon their axles by means of wooden wedges. But as wood is apt to swell with water, the wedges not unfrequently caused the stones to split, and fatal results were common. Now they are generally held at the sides by a pair of strong iron plates, like quoits, screwed tightly to the stones, which, even thus fastened, not unfrequently break. On the whole however they are far more secure, and the accidents resulting from breakages are less serious in their character. When it is stated that these stones make from 100 to 200 revolutions per minute, it will be understood that the heat generated by friction between the stones and the blade, under a pressure of several pounds, will be very great. Indeed, it is such that a piece of iron or steel would become red hot in a few seconds. This of course would destroy the temper of the blade, and render it unfit for use. To obviate this, the stones revolve in a trough of water, thus keeping the blade cool while grinding it to the required sharpness. The stones are used until they are reduced to little more than half their original diameter. The next process as regards

table knives is to glaze the blades. This is done on a large tool called a "glazier." It is from 3 to 4 feet diameter, and about 2 inches broad. It is formed in sections of dried wood to prevent cracking, and on this surface, or covered with leather, "dressed" with emery prepared with beeswax, the blades are glazed several times, until of the required fineness. Spring knives are ground upon stones from 30 inches to 9 inches in diameter, and varying from $2\frac{1}{2}$ to 5 inches in thickness. The blades are first roughly ground, to reduce them from pieces or lumps of steel to cutting instruments, and to enable the "cutler," or "setter in," to fit them to the hafts. A description of this latter operation forms no part of this paper. It often happens, however, that the edges of the blades are injured before the knife is completed, so that the edges have to be restored, and the requisite polish given to the blades. This is called finishing, but is the work of the grinders. In finishing the blades it is necessary that they should be re-ground, to take "snips" from the edges, and to reduce the blade to a proper degree of thinness. Another reason for this process is to give correct proportion and nice accuracy of form and outline to different patterns, and to ensure evenness along the cutting part of the blade. This process was formerly done upon dry stones, and was considered highly detrimental to the health of the workmen, and many attempts have been made to remedy the evil, or to prevent it. The most successful plan yet introduced is a revolving fan, which is connected with a pipe extending from the front of the stone to the exterior of the building. The action of the fan effects a partial exhaustion of the air in the pipe, and the atmosphere rushing to supply the partial vacuum, carries with it the particles of grit and steel evolved from the surface of the stone. But for the strength of this current these particles would be inhaled by the workmen, and produce that distressing complaint known as the "grinders' asthma." The most effective means of preventing this disease is not to use the dry stone. This is rarely done in the spring knife trade, as it is proved by experience that the work formerly done on the dry stone can be done as well on a wet one, with this advantage, viz., that in the use of dry stones, blades were frequently softened by friction, whereas by the use of a wet stone such occurrences are rare though not impossible. The dry stone is not yet, however, indispensable, as will be seen hereafter.

When a blade is reduced to a proper strength and elasticity on the edge, which should be done on a small stone, to insure the concavity of its sides, the next process is to give it smoothness and more complete regularity than can be effected on a stone; this is done on a tool technically called a "lap." It is a wheel, formed, as before stated, in sections of wood, covered with a surface of lead; this, also, is dressed with emery and beeswax, and greater fineness is given to the steel by the use of vitreous or siliceous stones. For all the purposes of utility, the blade is now sufficiently complete; but where a high finish is desired, it is polished by friction with *crocus*, or oxide of iron, upon a wheel covered with leather. This operation is mostly performed by boys, who begin to learn their trade by finishing the articles upon which they are employed. The blade now only requires to be "set," or whetted, and it is ready for use. Some of the more common kinds of cutlery are done on a wooden glazer. The appearance of this work is rather coarse, but good useful blades may be got up in this manner.

The operations in grinding scissors bear so close a resemblance to the above, that to describe them would be a needless repetition. There are, however, some points of difference in razor-grinding that it may be worth while to mention. In manufacturing the better class of razors, it is usual to "shape" them before they are hardened; and this operation is performed upon a dry stone. The reason for this is, that a stone revolving in water is much softer than when dry; and as the process of "shaping" is much like scraping the stone away, it will be evident that the use of the dry stone is more economical; and as

razors are done on very small stones, there would be considerable loss of time in preparing new ones if they were worn down with needless rapidity. The steel also being soft, the operation is more rapidly performed, and no injury done to the blade by frictional heat. When hardened, the blades are ground upon small stones. The concavity of the sides of some razors may be judged from the fact of the stones being worn down to three inches diameter. Some razors are made still more concave by being ground on a stone with a round surface; but this is a more difficult and costly process, without being attended with corresponding advantages. Good razors may be done on tools six or seven inches diameter. This will give the necessary elasticity on the edge, and increased concavity cannot lessen the cutting angle of the edge, on account of the thickness of the back. The finishing process is much the same as in pen-knives. The weight of a razor appears to have considerable influence in the operation of shaving. The heaviest razors, *cæteris paribus*, shave with the greatest ease. Of course, it will be understood that they are not to be so large as to be unwieldy.

I trust the foregoing remarks are sufficiently explicit to convey an idea of the ordinary process of manufacturing articles from steel. There is an almost infinite variety of things so manufactured. But I have adduced cutlery as very fairly representing the processes adopted in all steel manufactures, and as being the most likely to be comprehended by all parties who may feel interested in the subject.

Respecting the character of the workmanship of the present day, I have no doubt that in general excellence great progress has been made. Specimens of skill in by-gone times may easily be adduced, and placed in contrast with modern workmanship. But a fair comparison would place the best of a past age with the best of the present, and I think it would not be difficult to show that satisfactory progress has been made. The meeting may form their own judgment from the articles before them. Taste is not a subject of rule and dictum. But I think it will be conceded that the productions before us show some evidences of taste considerably in advance of those of the last generation. Still I must acknowledge that there is ample room for the cultivation of taste amongst our artisans; but I am not aware of any adequate efforts being made to accomplish this object. I fear there is but little disposition on the part of the men themselves to bestow the requisite care and attention upon it. Probably the establishment of museums of local manufactures, and corresponding productions of foreign countries, might awaken an interest amongst our artisans, and induce them to devote the time and attention to this subject which is too often spent in frivolity, or, perhaps, in vice.

Having endeavoured to convey an idea of what is essential to excellence, I proceed to the second part of my subject—and it is not without reluctance that I do so, as it is painful to all right minds to contemplate dishonesty and imposture reduced to a system. The moral sense of mankind seems to have become subordinate to their pecuniary interests, at least, in many instances. Attempts are made to gain rapidly by dishonest means that wealth which it requires a life of honest perseverance to obtain. The method commonly adopted is to produce imitations of articles of known excellence, and of every day utility. All branches of manufacture are liable to imitation with more or less chance of the imposture being detected. But there is great difficulty in detecting spurious articles of steel manufacture, as it is only by attention that a practical cutler would make a discovery of imposition, while the non-practical man would have to purchase his knowledge by experience. Nor would he be certain that the detection of one fraudulent imposition would secure him against another, though it might against a repetition of the same. How far any remedy might be applied to these cases, would, I think, form a good subject for the consideration of the Society of Arts, Manufactures and

Commerce. But to this subject I shall revert towards the close of this paper.

There is nothing immoral in the attempt to manufacture at a cheap rate. But as cheapness is obtained generally by inferior material and workmanship, it is dishonest to sell such goods for those of superior quality. Considering these two sources of cheap productions, I propose to show the kind of material and workmanship generally employed, and, contrasting these with those mentioned in the former part of this paper, there will be no difficulty in understanding the difference between good and bad cutlery. "Good" and "bad" are terms preferable to "cheap" and "dear," because a bad article is dear at any price, and utility and excellence are the only cheapness.

The first effort after cheapness of production is inferiority of material. I place this first, as it is the least troublesome method. An interference with labour is a source of unpleasantness. The specimens on the table, showing the process of forging of the best cutlery, will give an idea of the labour bestowed on such articles. The frequent beating with hammers gives great denseness and cohesion to them. Inferior steel would not endure such working, nor produce the like results. The commonest goods are produced "at a heat," viz., they are "cast" or "run." I may state here, to prevent misconception, that "cast steel," which bears the palm for cutlery, must not be confounded with articles "cast" from steel. The former is highly refined and cast into ingots, then tilted and rolled as before stated. But the steel from which articles are "cast" is very inferior, in fact but one remove from iron. This is melted, and blades "cast" from it in moulds by dozens, just as any small ornaments or metal work are cast in numbers. It is called "run steel;" but its inferiority is at once evident when tested by elasticity, or by fracture. This method has the additional advantage (?) of saving the cost of forging. Some of the articles thus made are as follows:—

SCISSORS.—Perhaps the system of making things of "run steel" commenced with scissors, and it would have been well if the manufacture had been kept to its original intention. I understand that a cheap instrument was wanted for the use of peasants in the wine countries to cut off the bunches of grapes. The acid of the fruit spoilt scissors of the best steel as soon as the commonest. So the idea occurred of making an exceedingly common article for this purpose, and the run steel offered the required means of doing this. And as the smallest possible amount of grinding that would give an edge was sufficient for the purpose intended, scissors were produced at prices fabulously low. This we may admit was a legitimate use of the cheapening process. But, alas! for honesty, the idea grew. The temptation to produce such goods in imitation of better, for household and business purposes, was too great, and a trade in rubbish has sprung up to an awful extent. I am informed, on undoubted authority, that scissors may now be purchased in any quantity at from two shillings and sixpence to three shillings *per gross*.

It is not to be supposed, however, that even run steel is used for these productions. No! the material is baser still—mere pig iron. That there may be no doubt on this subject, any gentleman present is at liberty to break the specimens and judge for himself. Run steel is used for those articles that are to be made in imitation of first-class goods. When first "run," or "cast," they are exceedingly brittle, and require annealing before they are "made up." There is necessarily great similarity in the casting of every variety of common cutlery. Table blades and forks are cast in large quantities, but the remarks already made on scissors render further particulars needless. I am not aware that any razor blades are made in this way. Some years ago the attempt was made, but the Razor Grinders Union passed a resolution that they would not grind such rubbish. I am glad of the opportunity of recording such an instance of honourable conduct on the

part of a body of workmen, as I sincerely wish that the moral sense indicated in that resolution could work its way amongst the manufacturers. Though this resolution prevented the introduction of one kind of spurious goods, it is not to be supposed that worthless razors ceased to be manufactured. I have been assured that large numbers of razors are made of such worthless material, that no attempt is made to harden them, as the process would be quite useless. The steel, if such it be, is of so bad a nature, that it would not harden, consequently, the razor, when ground, could not keep its edge.

Pen blades are too small to be made in this manner. They are produced rapidly by means of a fly. The steel is rolled into sheets of the thickness required. These are cut into breadths equal to the length of the blade intended to be made. The steel is inserted in a "bed" of a certain shape, and a stroke of the fly sends a corresponding punch through the steel, carrying with it a piece of rolled steel which is to act as a blade. It will easily be understood that a blade produced in this way is very inferior to one forged from a string of superior steel. It would not have the compactness and density which characterise the best class of cutlery. Blades made by the fly press sometimes go through the process of hardening. But the class of goods manufactured thus is almost invariably of a cheap and useless kind. They are made to sell, and that is the only object of their manufacture. I scarcely need inform my hearers that the *grinding* of articles of cutlery is a most essential process. However good the material, however skilful the forger, a blade lacks its essential property if it is not well ground. Now the defect of cheap cutlery is most apparent in this particular. In grinding, no regard is paid to the *edge* of the article. Indeed, it is not paid for. If the surface of the blade be brightened, it is all that is required. It has the appearance of a knife, may be sold as one, although it does not possess the property which should constitute its recommendation and its utility. In proof of this, I need only refer to the specimens before us.

I must, in candour, acknowledge that I have here presented something like the extremes of cutlery manufacture. It must be understood that there are all degrees of excellence, from one extreme to the other. Some are deficient in material, some in workmanship, and some in both. I do not see any reasonable objection to the production of any of these articles, provided they are sold for what they really are. But they are highly pernicious when offered for what they are not. It is then that they become a cheat upon the purchasers, and injure the character of an important branch of our national industry. The more closely these goods are made to resemble those of our most noted manufacturers, the greater the cheat. There is a large trade in foreign-made spurious cutlery, and I am assured by mark-makers in Sheffield, that they execute large orders for the Continent for marks imitating those of respectable Sheffield manufacturers. On inquiring whether they consider it honest to execute such orders, I was informed, that, "if they did not make them, somebody else would." Such is the simple fact, and the morality of the transaction is rarely called in question. It is a piece of piracy of the worst description. I am not aware of any remedy that a manufacturer has who is thus defrauded of his name and trade. Nor do I see how a remedy is to be applied in this case, unless by a system analogous to that of international copyright. But it appears to me that measures might, and ought to, be taken to check or punish those who are guilty of this kind of forgery at home. And this is a subject which I humbly suggest to the Council of this Society for consideration. It is a question more particularly for the manufacturers, but I do not know of any organisation amongst them to procure a remedy for such an evil. The Society of Arts would be an admirable agent for the accomplishment of this object.*

* Since this paper was written, there have been several intimations in the subjects discussed by the Society, of the im-

Though legislative interference in matters of trade is generally to be deprecated, I think it would not be difficult to "make out a case" on the "marking question." This is a subject on which a strong feeling is sometimes manifested in Sheffield; and it is only reasonable to suppose that manufacturers in other localities, and other branches of trade, are equally subject to be defrauded by similar means. In my opinion, it is erroneous to lay down such general propositions, as that "all legislative interference is injurious to trade," &c. It may be pernicious for our rulers to interfere, and dictate as to the mode of conducting a business; but it would not be out of the province of government to restrain and punish fraudulent transactions. A very simple law might be passed rendering it compulsory on every manufacturer to strike some *distinctive* or distinguishing mark on all his goods. That would be all that is required to give every honest manufacturer all the protection he needs, and it would be ample restraint upon the dishonest, who trade by systematic imposition. Every printer or publisher is required legally to print his name or an equivalent upon his issues. Why should not every manufacturer be compelled to do the same thing in effect? To strike his name merely would be insufficient, as names are common property. But a distinctive mark ought to be compulsory to protect the honest and to punish the dishonest trader. There is a common fallacy respecting *striking names*. It seems to be held that a man's name is his mark. It would be if no two men had the same name. But so long as names are common, common names cannot form distinctive marks. Allow me to give an instance to illustrate the fraud and enforce the argument at the same time. John Smith, by long attention to the details of manufacture, has established a remunerative trade, and, as he hopes, an abiding reputation. He uses the best materials, employs the most skilful workmen, and strives to stand in the front rank amongst his competitors in trade. Finding that the goods of John Smith have a call in the market, some factor who desires to have a large profit, will not purchase goods of the John Smith; but he seeks some man of straw of the same name, and employs him, (or even borrows his name,) to make cheap articles of the same patterns as those that have a call in the market. He is then prepared to sell the goods of John Smith cheaper than the manufacturer himself, as the purchaser supposes. The real John finds his trade falling off. Constant complaints reach him that his goods have deteriorated, and that his customers must really buy of some other manufacturer, unless he returns to his former excellence. He hears that spurious goods are in the market. Some are returned which he finds are not of his manufacture. And tracing them he discovers the delinquent. And what then? He has no remedy. If he applies for an injunction, he is told that spurious John Smith has as great a right to strike his name, as real Smith has to strike his, and that he is trying to create for himself a monopoly, and to crush a poor man. What are the effects of such a state of the law? The *bona fide* manufacturer is injured in his trade and reputation, dishonesty and imposture are justified, and the public are swindled. I am aware it is commonly held that the public are quite competent to look after their own interests, and that any protection for them is needless and impertinent. But the numerous cases that have occurred to my own knowledge, where parties have been imposed upon, even in Sheffield, convince me that the public generally are not competent to detect spurious

portance, I might say the necessity, of some steps being taken to insure the public from imposition of spurious manufactures, and to give to honest manufacturers the benefit of their probity, skill, and enterprise. Writing from memory, I think Mr. Whytock mentioned the subject in his paper on the carpet manufacture, and it has arisen incidentally since. I judge, therefore, that there exists a grievance, more or less, in all seats of manufacture on this subject. Can anything be done in the matter?—J. W

manufactures, any more than they are generally able to analyze their food and detect the common practice of adulteration. The case I have supposed (which is however, a real case *mutato nomine*), the law justifies on the ground of abstract right; and it is another instance of strict adherence to abstract right, inflicting a positive wrong. No doubt one Smith has as good a right as the other Smith, to place his own name on his own productions. But doing so with a view to dispose of his productions, as those of another man, ought to be a legal offence, as much as it is a moral one. If the Smith of imposture wished to preserve his mark as a distinction in trade, let him have a *distinguishing mark*. If he wished to raise for himself a trade, it would be to his advantage that his goods should be unmistakable. But when he insists upon using a mark which he knows belongs to another, and has a market value, it is evident that he has a dishonest intention. Against that intention I think it is the duty of the legislature to provide protection, both on behalf of the public and in justice to the honest manufacturer. For these reasons, then, I would render it compulsory upon every manufacturer to use a distinguishing mark, other than his name. I think it would prove the surest check upon the production of spurious goods, and, at the same time, offer every inducement to the manufacturer to make the best articles. I am aware that it is actionable in a court of law to pirate a mark, but it is evaded by the intervention of men of straw, against whom it is certain loss to proceed, for they exist in such abundance, and having nothing to lose, they almost bid defiance to the law. Let it be made felonious to forge a mark, as it is to forge a signature, and there will be but little inducement to rob a manufacturer of his honest name. I should have but little confidence in any remedy that did not go to this extent; and I trust the manufacturers of this country will take up the question with the earnestness that the case demands.

To prevent any misunderstanding, I may be permitted to remark, that I am in no way opposed to *cheap* manufactures, except they are spurious as well as low-priced. I have before stated that no article is cheap that will not answer the purpose for which it is professedly made. That may be taken as a fair test of cheapness. However low in price an article may be, if it will not do what is reasonably required of such articles, it is essentially dear. But in many articles manufactured from steel, cheapness is not incompatible with excellence. For instance, here is a pen-knife which, for utility, is equal to any that can be made. It is plain in workmanship, and has nothing costly in the handle. The price is under a shilling, and, as a knife, it would be no better if it cost ten, the addition being made by more costly material and workmanship expended on the handle. There is a common argument, used in favour of low-priced articles, which I think extremely fallacious under the circumstances; it is, that manufacturers have to meet the wants of all customers, and must manufacture accordingly. "The man who has only a shilling to spare for an article—suppose a knife—can only have one worth the money for it," &c. This would be all very well were he to get a shilling's worth for a shilling; but, more frequently, he has sold to him a showy thing that, for utility—the test of cheapness—is not worth a penny. I have already shown that cheapness is not incompatible with utility, and the humblest individual may obtain articles suitable to his wants, and according to his means; and more especially would this be the case were every manufacturer compelled to strike upon his productions a distinguishing mark. This is the great desideratum of our national manufactures if we are to maintain our supremacy amongst the nations; and I most earnestly desire the Council of this Society to give the subject a candid consideration, as I know of no means whereby they could more effectually encourage and promote Arts, Commerce, and Manufactures in this country; and especially do I think such a course would be advantageous to those branches of

industry which have formed the subject of this imperfect paper.

Before concluding, I must ask the indulgence of the meeting while I state a few desiderata for the cutlery trades of Sheffield. I am aware that the *Journal* of this Society is read in nearly all parts of the globe; and as there exists great deficiency of ordinary materials for forming the hafts and handles of cutlery, it is possible that the mention of this fact may open new sources of supply. The better qualities of ivory and stag are scarce and dear. Indeed, *horny* substances are much required. Wood of various kinds has been used, but it is not generally so satisfactory as horn of any kind. The woods most commonly used are cocco, ebony, rose, partridge, and snake, for spring knives; and for the larger articles, as butchers and bread knives, beech and other English woods. However, timber of any kind yet introduced is not in high repute for spring knives; and, in the absence of horns or shells, no composition handles have met with general acceptance. I think there is room for investigation and experiment in this department of our industry, and I shall be glad if this incidental mention of the subject should lead to a successful issue.

DISCUSSION.

The SECRETARY stated that he had received communications from Mr. Moulson and Mr. Sanderson, both of Sheffield, which, with the permission of the meeting, he would proceed to read.

Mr. THOS. MOULSON (ex-Master Cutler, Sheffield) says, that while there is much in Mr. Wilson's paper which he admires, there are a few points which he thinks might be improved upon. Having acted as the only juror * from England upon steel and its products (Class XV. Group 5) at the Paris Exhibition of 1855, Mr. Moulson at the time addressed a letter to Mr. Wilson Overend, the President of the Committee of the Sheffield Exhibitors, in which he remarked that, "It has been my opinion for some time that the French were superior to us in point of designs for ornamental work. This I found to be the case in their better class of cutlery. In this respect they are superior to even what I had expected; and not only so, but the workmanship, or what may be called 'putting together,' is, I consider, superior to our best class of manufactured goods. If they are deficient at all, I think it is in their grinding, and their table-blades I consider too thick. The Prussians are improving very fast, both in tools and cutlery, and, I am informed, export to a considerable extent. Many of their goods exhibited are a near approach to Sheffield. I come to the conclusion, then (which is not a new one with me), that Sheffield cutlery, instead of improving, as the cutlery trade has done in other countries, has been on the decline. There are exceptions. While foreigners have been progressing, we have been either stationary or going backwards. I do not wonder, when I take into consideration the system on which the Sheffield trades have been conducted for the last thirty or forty years. Certain causes produce certain effects, and until these causes are removed we shall continue in the same degenerating state, and find it out when it is too late to apply a remedy." He observes that if the Sheffield cutlery trade be in a declining state, it might be worth while to inquire why this was not ascertained sooner, and whether the present agitation in the matter is due to the Paris Exhibition, or to what other cause. It might also, he thinks, be useful to know what proportion the better class manufactures of cutlery bear to the moderate and spurious makes. It would likewise be desirable, in his opinion, to ascertain with some degree of certainty whether, during the last forty years, the cutlery trade of Sheffield has increased in proportion to the increase in population;—whether there

* Although Mr. Moulson was the only juror in this class, it should be stated that Mr. J. J. Mechi was appointed and acted as supplementary juror.—SEC. S. OF A.

is the same proportion of good workmen now as formerly—and, if not, is the falling off due to the large quantity of cheap rubbish that has been produced;—why our trade with the United States in axes, long saws, and augers has nearly vanished, although America used to be our best market; and lastly, of what material the steel is made from which the different kinds of goods are produced. It will be found, Mr. Moulson believes, that the best steel for pen blades, razors, &c., would range from 60s. to 80s. per cwt., whilst that for commoner purposes, made of old nails, old horse-shoes, &c., or in short anything that would melt in the crucible, would not cost more than from 20s. to 30s. per cwt.

Mr. CHARLES SANDERSON says:—

"I have read Mr. Wilson's paper upon the important staple manufacture of this town with much interest, and I trust that this is only the beginning of a series of papers tending to develop that gradual perfection which is being attained by our talented artisans.

"Although much has been said regarding the decline of our manufactures, and that we are even behind some of our continental neighbours, I have yet to learn that experience, either in the manufacture of steel, or of steel articles, can be acquired in a few years. True it is that our first-rate cutlery exhibitions are inspected by our continental friends, who favour them with small orders for their best and newest patterns—which very shortly appear in our large export markets at a cheap rate, comparatively, but very seldom so good, even in appearance, as our Sheffield productions. Manual labour is cheaper on the continent than with us; but their steel is not so good; it is not so well manufactured, nor are the articles put together with that skill and neatness which so universally distinguish our own. Yet we must not sleep in fancied security; Westphalia has made rapid strides, and France also is improving. A comparison of cutlery made in these countries, some twelve to fifteen years ago, shows the great advance which has been made. By continual improvement, we therefore must endeavour to maintain our position.

"Mr. Wilson very justly condemns the use of inferior steel, since the value of the steel required for any knife, &c., forms a very small portion of its cost. The use of soft steel is very large, because, being easily worked, the articles are more readily made; but no workman can give such steel its proper degree of hardness, or reduce it to its required temper or elasticity. But Mr. Wilson will, doubtless, explain to you why cast-steel for penknives and razors is required harder than that used for pocket-knives, and why also steel for scissors is softer still. This seems to me important, because it will show that steel of any defined degree of hardness is not applicable to the manufacture of every article; it will show that the steel must, at all times, be manufactured of such a quality and degree of hardness as to fit it for the especial production of the article required. The theory of hardening steel will doubtless be an interesting topic for discussion, and some difference of opinion may arise, whether the operation produces a contraction or expansion of the metal; or whether this singular property is due to a different or changed molecular arrangement. This question will, of course, be considered in connection with the process of tempering.

"As regards metal called 'run steel,' the article manufactured from it forms a distinct trade from 'steel' articles, which are always fashioned by the hand. Manufacturers at once discover that these cast-steel articles are not steel, and purchasers find but little difficulty in doing so; some articles are finished very highly, and scissors, perhaps, approach the nearest in appearance to cast-steel. These articles are 'cast' from charcoal pig-iron, sometimes from a commoner kind, and therefore can scarcely come under the category of 'steel articles.' These cast-iron goods are made in large quantities, and, in distant countries, are sold as steel; whereas the material is only cast-iron. These articles, when cast, are subjected to an

annealing process, and are covered with oxide of iron; they thus lose a portion of their carbon, and at a low heat become partially malleable.

"Permit me to call some attention to this metal; it is capable, I think, of material improvement; if the articles made from it are intrinsically better in proportion to the purity of the metal from which they are made, some amelioration in the preparation of such metal would be of practical use.

"Mr. Wilson calls your attention to an important matter connected with the manufacture of cutlery. Ivory and stag's-horn are both very dear; wood of various kinds has been used for knife handles; it would be very interesting to consider whether some new substance cannot be introduced, the production either of nature or art."

Mr. J. J. MECCHI begged to correct the statement contained in the communication from Mr. Moulson just read, that he was the only English juror appointed for the examination of articles of steel manufacture at the Paris Exhibition. That gentleman was mistaken on that point, inasmuch as he (Mr. Mecchi) had the honour of being appointed a juror, and owing to some accidental cause he was the only juror for that department during the first fortnight after the opening of the Exhibition.

The CHAIRMAN believed Mr. Moulson meant to convey that he was the only juror appointed for Sheffield.

Mr. MECCHI said, as he had had the honour to investigate the products of steel at the Paris Exhibition, he might perhaps be permitted to take a more general view of the great importance of that manufacture than had been mentioned in the paper before them, for which he was sure they all felt very much indebted to Mr. Wilson. He might remark that it was a question which largely affected their nutrition, clothing, punctuality, correspondence, locomotion, navigation, and their personal and national safety. It was quite clear, as regarded their punctuality, the question of making good watch-springs was of great importance. With regard to correspondence, there were the ship-loads of steel pins. It was true they were not made in Sheffield, but the steel from which they were manufactured came from that place. Again, with respect to clothing, needles were made from steel-wire drawn in Sheffield. The drawing of the wire was an operation of great importance, and they must have the purest steel to make the best needles. Messrs. Cocker, of Sheffield, were noted in the French Exhibition, as not only being superior in the manufacture of steel-wire, but also as the makers of superior wire-drawing machines, which were of equal importance in reference to that branch of steel manufactures. With regard to nutrition, leaving out of the question reaping-hooks, scythes, and other things of that kind, within the last year or two steel had been extensively employed in the manufacture of digging-forks. In 1851 a committee of the Royal Agricultural Society was formed as examiners of agricultural machinery, but, in their report, they omitted to notice a small bundle of steel forks, of a very light description, which he obtained from the maker for the purpose of trying them on his farm. It was the fact, that twenty-four men who were employed in digging in his field, at task work, received those forks with perfect ridicule. They were so light, they said, that they might do to throw a little straw into a cart, but they had no value beyond that. He told them to make a trial of them: they did so, and an hour afterwards they quarrelled to see who should get possession of the forks, which effected a diminution of labour to the extent of at least 25 per cent. Since that time he had called attention to the subject through the public journals, and at the present time many thousands of those steel forks were to be found in use throughout the United Kingdom, and there could be no doubt they would have a wonderful effect in the cheaper production of food. They were useful for every purpose of agriculture—even as dung forks, hay or harvest forks, or any other purpose where the arms had to be lifted a great many times during the day—and as the

steel fork to which he referred weighed 2 lbs. less than the ordinary iron fork, when they considered the many thousand times a day that the arms of the workmen were lifted, it made a difference of several tons a day to the workman, in addition to which the lighter steel implement possessed a greater power of elasticity, and insinuated itself, by its diminished bulk, where an iron fork or spade could not possibly enter. Although Mr. Wilson had alluded in his paper more particularly to the cutlery manufacture, he (Mr. Mechi) thought a great deal more importance attached to the production of tools. When they considered that the bricklayer's trowel was made of the best steel, the stonemason's cutters, and a variety of other tools, but, above all, saws, files, and various parts of machinery, it was a matter of the greatest importance. What was the use of the great forests, unless they had saws and axes to cut them down. It struck him, during the Exhibition in Paris, that tools formed the most important feature in the productions of Sheffield; and they were so considered by the authorities there, and the award was given to Messrs. Spear and Jackson, who exhibited great superiority in those productions. In fact, Sheffield might be said to be pre-eminent in the department of edged tools, taking the world together. Of course there were some excellent productions in the same department from other nations. Those from Prussia might be said to stand second, in regard to quality and price, and in tools they came very closely upon those manufactured in this country; but, on the whole, he came to the conclusion that there was a neatness and finish about the tools exhibited from this country which gave them the advantage over all others, to say nothing of price. It was quite evident that they were open to competition in the article of steel with any other nation, in regard to the best materials. For instance, almost all the best articles of this country were manufactured from Swedish iron. The iron of this country varied greatly in price, according to the quality. The common cast-iron was bought at from £5 to £6 per ton (he had bought it as low as £4), up to the best Lowmoor iron, at £18 per ton. But Swedish iron was always used for the best manufactures in Sheffield, and the price ran as high as £36 per ton, whilst the steel made in Sheffield was reported to him by a member of an eminent house there, to range at prices varying from £20 to £80 per ton. This brought him to the question of personal and national safety. The best quality of steel, at £80 per ton, was used for the manufacture of swords, and he might add that he wished the same description of material had been used for the trenching tools and the other implements used before Sebastopol, which were as necessary for the success of our armies as the swords themselves. He ventured to say it was a fatal mistake in such things to have any but the very best articles to carry out such an object. He had said that foreigners might compete with this country in the steel manufactures. They could buy the iron in Sweden at the same price as we did, therefore, if they had no import duty, and if their labour was cheaper, talent equal, and machinery and means of inter-communication equal, there was no reason why foreigners should not compete with this country in the production of steel manufactures. To some extent that was really taking place, but fortunately for this country certain other nations had not yet arrived at free trade principles, and, if he might be allowed to say so, were unwise enough to lose the importation of the raw material, thus giving to this country an advantage which it would not otherwise possess. On inquiry of the Paris cutlers what steel they used for their best productions, they told him Huntsman's—the oldest name in Sheffield—that is, Swedish iron converted into steel for use; or that of Messrs. Spear and Jackson, or Turton's, and they paid a considerable duty on the importation of that commodity before they manufactured it. Hence it was quite clear that we had nothing to fear from French competition, so far as price was concerned. But he confessed he agreed to a great extent with Mr. Moulson in his remark that the

best descriptions of Paris cutlery were equal to our own; and in the design and carving of the handles he should say they were decidedly superior. That was not his own opinion only. Having had conversations with nearly all the eminent cutlers of Paris with whom he was brought in contact at the late Exhibition, he asked them how it was they had made such advances in their manufactures since 1851? They replied that it was our Exposition of 1851 that had done all this. They said they found they were so inferior in this manufacture to what they imagined themselves to be, that they set to work to make an improvement, and the result was the beautiful quality and polish which they now saw in the French goods, and which did great credit to their perseverance. There were advantages of course in having the best steel as a natural production. That occurred, particularly in Austria and parts of Prussia, and he believed in some parts of Belgium. But the Styrian steel was what they called natural steel—something like the Swedish iron—a very fine production, and that enabled them to have a large trade in Austria in scythes, and other agricultural tools. They were rather roughly constructed, but were nevertheless excellent in quality and efficient in operation. He need not advert to the great superiority of the implements manufactured by Mr. Krupp. He believed the same gentleman exhibited the beautiful cannon which was the object of so much attention in the Exhibition, and it was marvellous to see the fineness of the grain of the metal and the excellence of the finish of the whole of the productions which that gentleman exhibited at the French Exposition. It was evidence not only of a good natural production and of great science in the conversion of the material, but showed a determination to excel, which must ever ensure success. There were, besides, some very neat Swiss productions, in the shape of remarkably fine files, and tools for making the small and beautiful watches peculiar to that country. There were very few fine specimens from Spain, Portugal, Italy, or any other country. Their great rivals were Prussia, Belgium, and France. To show that what he had said relative to the conversion of steel was correct—he would mention that he found a celebrated firm at St. Etienne (Messrs. Pierre Jackson and Co., a house of English foundation) was converting Swedish iron, of the best description, into steel, and so nearly were they approaching our own productions that the Parisian cutlers used that steel in competition with the best Sheffield steel that was converted in this country. He did not agree with the author of the paper, that cheap things should not be made. Many people had very little money to spare, and those who had but threepence could spend only threepence. He had no difficulty in getting samples of the cheap razors, &c., alluded to from Sheffield. Messrs. Spear and Jackson had sent him specimens of table knives and forks, at 1s. 10d. for 24 pieces, and he had no doubt that those who had threepence to spare for a pair of these knives and forks would find them very useful. Another sample were 2s. 1d. the dozen. The razors—which were wrought—not cast, were 1s. 6d. the dozen.

The CHAIRMAN.—I think they would scarcely be found of any use.

Mr. MECHE thought they would be found of a certain use. There were scissors which would cut, at 2½d. per dozen! As a proof that foreigners might compete with us if they could get the steel as cheaply as ourselves, he would mention that in the Paris Exhibition some files were shown, very fine and good, and he had ascertained that the English market was supplied with these files. Where the material amounted to only about 15 per cent. of the cost of the article, that is, where the labour amounted to 85 per cent. of the cost, they could supply the English market with those articles, but where the cost of the material formed a greater proportion, they were no longer able to compete with us. But after all it did appear that our great advantage of coal and iron, of railways, of canals, our general machinery and general facilities of intercourse,

gave us considerable advantages over other nations who were inferior to us in those respects. Amongst other interesting things he might mention the fact, that an order was given for 2,000 tons of submarine telegraph wire, of the thickness of a tobacco-pipe, at £12 10s. per ton, which order was obtained in consequence of the invention of an ingenious machine for drawing the wire at a small cost, and in extraordinary lengths. Mr. Mechi did not agree with the opinion expressed that Sheffield cutlery had gone back. He thought it exhibited a decided improvement.

The CHAIRMAN understood Mr. Mechi to say that he considered the cutlery of England had not progressed in the same degree as that of Prussia and other countries.

Mr. MECHE—In design and finish of the handles, &c. He would be glad to know if Mr. Mappin had tried hardened gutta percha for knife handles.

The MASTER CUTLER (Mr. F. S. Mappin) said he had been much pleased with the very able paper read by Mr. Wilson, stating so minutely the process of manufacturing cutlery in Sheffield. He had also heard read with much regret the letter from the late Master Cutler of Sheffield, the greater part of which had previously appeared in the Sheffield newspapers. So much having been said about the inferiority of Sheffield cutlery, he feared the impression generally would be, that first-class goods were not manufactured as heretofore. This he was fully able to refute by the specimens which he now produced, which, he firmly asserted, no foreign manufacturer could equal. He was further borne out in this by the Cutlers' Company of Sheffield, which was composed mostly of manufacturers of cutlery, who, after fully considering the letter alluded to, passed a unanimous vote that it was contrary to fact. He might say, in passing, that the late Master Cutler was a manufacturer of edge tools, and not of cutlery; therefore his opinion could not, and did not, carry that weight that was supposed by the public generally. The meeting had no doubt been surprised at the very low prices quoted by Mr. Wilson for some of the specimens produced, yet he (the Master Cutler) would assert, that a good razor or penknife could be purchased of the very best manufacture for one shilling, and which would give satisfaction to the buyer. It was certainly plainly finished, but the razor would shave well and the knife retain its keen edge. It was urged that a distinctive mark was required besides the maker's name. Now, the Cutler's Company granted such corporate marks to any maker of knives, razors, scissors, files, or edge tools, on application, and any infringement of such mark was piracy, and the offender on conviction was summarily fined by the magistrate. Run steel scissors were certainly made in large quantities, and were so well finished that it was impossible for any person, unless practically acquainted with the trade, to say they were other than good articles, until they were tested by use. He, therefore, recommended all purchasers of cutlery to see the name and address of the maker was stamped upon each article, and to pay a fair price for it: they would then have a guarantee that what they bought was good. He fully agreed with Mr. Wilson, that there was a great want of a good substitute for ivory and other horny substances, the former of which was very scarce, and had hence become enhanced in value. No attempts to procure a good substitute had as yet been successful. He trusted, however, by the extensive circulation of the *Journal* of this Society, that attention might be drawn to the great want now experienced by the cutlery trade of Sheffield of such a substitute for ivory, and that it would lead to a successful result.

Mr. HADFIELD (M.P. for Sheffield) said, the Master Cutler had somewhat anticipated the few remarks that he intended to offer on this subject. He thought it a significant fact, with regard to the alleged decline of the trade of Sheffield, that from 1851 to 1856, there had been an increase of population of 24,000 upon a total of 138,000. This, he thought, showed that the trade was not on the decline, or that very large increase of population would

not have been attracted there. He regarded the freedom of discussion as one of the most precious privileges enjoyed by Englishmen. They knew their own faults at least, and slight additions were sometimes made to them. He invited them to go to the bottom of the subject. They now had a knowledge of the disease, which, according to the old proverb, was half the cure. There was a parliamentary committee now sitting upon the adulteration of food, which, he believed, would disclose astounding facts. The quantity of poison they were in the habit of eating and drinking, and the adulteration which existed in so many forms, he was sure were calculated to arouse a strong feeling on the subject. Such a statement as Mr. Wilson had given them that evening, he was sure the town of Sheffield ought to thank him for. Let it be published throughout the length and breadth of the borough, and let every man know what was the real state of things, and when they knew it, he thought they would set about to provide a remedy. But he thought, although the public suffered much, yet that they themselves were sometimes in fault in the matter. The government were certainly in fault. They did not go to really responsible parties to obtain the best goods that could be had, neither had they given remunerating prices for the articles they wanted. That was a very serious thing, but the result of a government of routine was bad managers, who got high salaries for doing very little, and that little done by inexperienced and unpractical men. It was suggested by some of his own constituents, that it would be good policy on the part of the government to have some practical man from Sheffield for the purpose of testing the quality of the articles supplied to the government. It seemed as if our army was in danger through the imperfection of the tools they had to use, and on this matter the press of the country, for which he had a profound respect, did the State good service, by laying before the public the whole truth of the case; they might bring bushels of certificates as to the quality of the articles supplied, but the lamentable fact came out that the axes would not cut the timber, nor would the tools supplied to our army stand the severe work of the trenches. The town of Sheffield naturally felt that it was an attack upon the trade of their town, and his constituents desired him to put the question to Mr. Monsell, the Clerk to the Ordnance, with respect to this grave matter; and the answer given was, that none of the articles complained of came from Sheffield. Under these circumstances, what was to be done? He was not accustomed to deal with these articles, and therefore he must theorise rather than speak practically; but he was sorry some remedy had not been provided. It was an excellent suggestion of Mr. Wilson, to call the attention of this Society to the subject. If they would have goods at the lowest price, they could not have them of the best quality, and it must come to that after all. Those ludicrously cheap articles produced before them that evening never could do the work for which they were designed. He thought, if a person had only threepence to spend, he had better not spend it at all for articles like those. It was a difficult question to deal with. The freedom of trade must be allowed for; but it was not yet apparent to him what must be done to induce the production of a good article at a fair price. He repeated that he thought great fault lay with the government; and they were now going to expend enormous sums of money to become manufacturers for themselves, notwithstanding that the Marquis of Lansdowne had said that the government were the worst manufacturers, the worst tradesmen, and the worst cultivators in the world. Yet they had voted several hundreds of thousands for the establishment of government works, to be conducted by government officers. In his opinion, it amounted to a perfect job! If they would allow the legitimate competitors in trade fair prices, they would have the best articles supplied to the army of our country. It was a fearful thing, as the hour of battle drew near, to find that our troops had been supplied with articles of inferior description and manufac-

ture. He had taken the liberty to say thus much, because he thought it desirable that the government of this great country should set a better example; and he believed the manufacturers would do well if they could suggest some better understanding with regard to the testing of the articles supplied for the public service. It was not in one trade merely, but in every trade. The Adulteration Committee, now sitting, would develop a vast deal of valuable information; and he thought it was one of those evils which must be traced to its foundation, and a stringent remedy applied.

Mr. MERRI said there was an extensive working of pure iron in Nova Scotia by the Acadia Company, and steel was exhibited at Paris from Australia.

Mr. JELINGER SYMONS said that, whilst engaged in making investigations for the government on the pathology of labour, he was made acquainted with the pernicious effects upon health of the occupation of the cutlery grinders, and had learned that the average duration of life of those so employed did not exceed thirty-five years. He was aware that different expedients had been tried to remedy these effects; but the workmen, for various reasons, had set themselves against them, and therefore the unwholesome state of things continued. He had hoped that the dry grinding would have been superseded by the wet grinding; for he felt more sympathy with the poor workman who had to manufacture these cheap articles than with the persons who bought them. He did not think any legislative enactment would meet the difficulty of the absolute frauds practised in the trade. He thought the only remedy for that was in the old maxim—"caveat emptor"—let the public give remunerating prices to the manufacturer, and the chances were that they would get a good article for their money. Let them look to the dealings in base coin. Although the most stringent laws had been passed with a view to check the system, they nevertheless found repeated and continued instances of the practice, and bank-notes still continued to be counterfeited. Mr. Wilson had suggested that a distinctive mark should be put upon cutlery. He thought that was already done.

The CHAIRMAN said it was only permissive—not compulsory.

Mr. SYMONS added that he thought there was nothing to prevent a manufacturer from putting his distinctive mark upon his own goods; but, at the same time, a man must look for his trade to the superiority of his goods over those of other manufacturers. He thought there was much less necessity for legislative enactment on this subject than in the case of many other articles in which the public were more imposed upon than in the excellent manufactures of Sheffield, in which he hoped they would always maintain their superiority.

Mr. MAY thought something remained to be said upon the point of protective measures either by distinctive marks or something equivalent. The object of making spurious articles was to deceive and defraud both the maker and the buyer, and, therefore, although legislative enactments might not answer the purpose perfectly, inasmuch as a person who would forge a bank-note would not hesitate to counterfeit a distinctive mark, yet some means of punishing the offender might be afforded. Being himself a manufacturer of chronometers, he had hoped to have heard some particulars respecting the manufacture of steel that would have been beneficial to himself; and in the particular branch in which he was engaged he was as much exposed to fraud as any other, and there was no lack of outcry in the present day against his trade as well as that of Sheffield. At the same time he was no more afraid of foreign competition in his trade than in that of Sheffield, inasmuch as he believed British artisans would always maintain the proud position which they held in the manufactures of the world. He thought the native energy and elasticity of the English workmen would always enable them to keep their place in the van. It was very encour-

aging to hear that the tools found fault with did not come from Sheffield; and they had likewise the satisfaction of knowing that vast numbers of watches bearing the names of English manufacturers were never made in England at all.

Mr. VARLEY was proceeding to offer some observations with regard to the manufacture of steel, when

The CHAIRMAN said he considered Mr. Varley's observations were scarcely pertinent to the subject before the meeting, which was that of manufactured articles of cutlery, &c., rather than the manufacture of the steel itself.

Mr. ASKHAM attributed the superiority of the finish of the handles, &c. of French cutlery, to the fact of the heavy import duty levied upon English goods of that class going into that country. The higher the finish the greater the price and the heavier the import duty. The English cutler manufactured for every market—the French for their own market only. He thought the United States had not sent a good muster of tools to the French Exhibition; but such as were sent he considered were superior to anything produced in Sheffield. The reason was, they used better steel than we did, although they imported it from this country; and augers were imported into this country from the United States made from Sheffield steel. The trade in those articles with the United States was pretty nearly gone, and it was the case he believed to a very great extent with regard to joiners' tools generally. He would say that the trade in chisels, axes, adzes, and in a great measure in saws, with the exception of one or two descriptions, was leaving Sheffield, and had gone to the United States.

Mr. MERRI remarked that some beautiful specimens of adzes, axes, augers, &c., were exhibited at the Paris Exposition, from Canada.

The CHAIRMAN said he could not but express his surprise at some of the remarks which had fallen, tending, as they did, to convey the impression that the cutlery trade of Sheffield was about to leave us altogether. They had seen, for many years, the regular publications of the Board of Trade, showing the amount of exports of manufactured goods from the United Kingdom as compared with former years, and all who had paid any attention to the subject, were well aware that the exports during the last four or five years had gone on increasing in a degree that no one, ten years ago, would have deemed possible, and in that increase the articles of Sheffield had borne a full proportion, or rather more, as compared with other descriptions of staple manufactures. No doubt many bad articles were made for the purpose of being sold, rather than for the use they were, but he doubted whether one recommendation of the paper could be carried out by legislative enactment, and, if so, whether it would tend to obviate the evil. One recommendation was, that every manufacturer of articles made from steel should mark some distinctive design upon them. That appeared to him to be taking such a liberty with manufactures as Englishmen would not submit to. It had been tried in parliament, but the house had refused it; and, if granted, he did not think it would be of any use. Was not all they wanted that John Smith, in addition to "John Smith," might strike a design, and if that design were pirated it would become a legal offence? That was as much protection to John Smith as if John Smith was obliged to strike a design. He agreed with the author of the paper, that in taking proceedings for piracy they might find themselves considerably deceived, but by treating such piracy more in the light of a forgery they would in a great measure overcome the difficulty. He thought there would be a better chance of that plan being adopted, than of compelling every manufacturer to adopt some distinctive mark. With regard to the position in which the cutlery trade of Sheffield stood, he differed from several gentleman who had spoken. He thought it might be that Sheffield did not send so many cutlery tools to the United States as formerly; but it was to be borne in mind that the Americans made tools of

the same style, and that on the tools imported into the United States a very heavy import duty was levied. In fact, it might be said that the whole revenue of the United States was raised by the duties levied upon imported goods. That would in some degree account for the exports of those articles falling off, but it would not show the reason for the fact that augers were largely exported from the United States into England. He could only account for this by the fact that the augers of the United States were made by machinery, whilst our own were made by hand, and it was a difference of cost. But when our artisans came to be properly educated, they would see that their own interests were the interests of the country in which they lived, and they would hail the introduction of machinery, which was essential to the country, the town, and the existence of the artisan. On the broad question of the comparison of our goods with those of Prussia and some parts of Belgium—and those were the parts which principally touched upon our heels in competition—we need have no fear. As to France, she had a description of manufacture which we had never attempted to touch; for instance, surgical instruments. Let them be made ever so good in this country, nothing was so highly esteemed by the faculty as a Paris-made surgical instrument, and it was difficult to overcome the prejudice that obtained in their favour amongst the faculty in this country. But as to all other descriptions of cutlery we need have no fear. They made them, it might be, quite as good as we did, but the price put them out of competition. That was not so with regard to many articles of Prussian and Belgian manufacture, and in this respect the manufacture of augers would apply. The effect left on his mind by the two great exhibitions of manufactures, with regard to Sheffield, had been this—that the quality of the Prussian and the Belgian articles was as good as those of Sheffield—that, in a great degree, their usefulness was pretty nearly as perfect, but they wanted finish. This was what he wanted our artisans to take into account, for finish was mere manual labour, and manual labour was cheaper in Belgium and Prussia than in England. If that were the state of the problem—if they could not by other means than manual labour put themselves a-head of Belgium and Prussia in neutral markets, those countries would be in a position to take us by the neck, if not to put us out altogether. They could not do it by manual labour,—it was too dear. It could be done only by machinery, and it was in that that his native town was especially deficient. He was not surprised that the feeling of the artisan was against the introduction of machinery. It was from the want of proper education that that feeling arose; but, as they became better educated, and as they saw their true interests in a truer point of view, they would see that wherever machinery had been largely introduced in trade, with, perhaps, one or two exceptions, the ultimate—if not the first effect—had been that a vast number more hands were engaged in that trade than were engaged in it before the introduction of machinery. The paper before them contained a mass of valuable information relative to a trade of great importance in this country, amounting, he believed, to the extent of £5,000,000 a year; and he hoped some member of the Society would feel it his duty and pleasure to move a vote of thanks to Mr. Wilson for the able manner in which he had brought the subject before them.

Dr. BOOTH, F.R.S. (Chairman of Council), said he was sure the Council of the Society would be happy to give any practical suggestions, for the protection of the honest trader against the dishonest, their most attentive and serious consideration. He then proposed a vote of thanks to Mr. Wilson for his able and interesting paper, which, having been carried,

Mr. WILSON, in acknowledging the vote of thanks, replied briefly to some of the remarks made during the discussion. With respect to the letter of Mr. Moulson, he gave that gentleman credit for good intentions; but for a

practical refutation of his remarks on the decline of Sheffield manufactures, he simply pointed to the specimens before him, none of which had been made expressly for exhibition, but were articles of every-day manufacture. With regard to the remarks of Mr. Mechi, he (Mr. Wilson) had not the good fortune, like that gentleman, to be acquainted with all the productions in steel—from a needle to a dungfork. He had simply introduced what he knew of the subject, not presuming to offer opinions, even on analogous subjects that had not actually come within his experience. What he had said of cutlery would apply to anything made from steel, whether as fine as a needle or as large as a piston. To produce a good article of any kind, it was first necessary to have good materials; and that worked skilfully, would produce the required result, whatever the article might be intended to perform. In reply to the question put to Mr. Symons, he said that forks were still ground upon dry stones. The fan mentioned in the paper was the best remedy ever discovered for the evil consequences of dry grinding. But the workmen, being tenants-at-will, would not provide fans as a fixture on another man's property. That gentleman also made a remark to the effect that buyers should be left to look after themselves. With all due deference, he submitted that they should not. He would take that assembly for an example. It would be no flattery to assume them to be, at least, equal in intelligence to the general public; but if he offered to them an article marked "Rodgers & Sons' cutlery, warranted," would they not reasonably suppose that they were purchasing the productions of that celebrated firm, and they would be justified, though mistaken, in the supposition. Again, he held in his hand a knife marked "J. Rodgers & Sons' Patent, Sheffield," and another, "Rodgers, Cutlers to Her Majesty." Would not one-half of them be deceived by the mark? Not one of the articles he had alluded to had been made by that firm. What he desired of the legislature was, that, if they would not protect the public, they would at least give fair play to the honest manufacturer. He knew of no practical popular test to judge of the quality of steel. Some people thought that by breathing upon a polished article they could tell its quality. If the vapour disappeared rapidly, it was deemed a good sign; but it obviously depended upon the temperature of the steel and the state of the atmosphere. Fracture was a test to some extent, but it was not likely to be adopted by the purchaser. With respect to the quality of steel as a raw material, many persons affected a mystery as to the object for which it was wanted. Let parties state to the steel refiner what it was intended to be used for, and there was no doubt steel might be had suitable to any purpose for which steel could be properly used. In conclusion, he thanked the chairman for his kindness that evening, and begged to acknowledge his obligation to Messrs. Rodgers, Mr. G. Wilkin, and other gentlemen of Sheffield, for furnishing the specimens which illustrated his paper.

The Secretary announced that the paper to be read at the meeting of Wednesday next, the 16th inst., was "On Thread or Fibre Gilding," by Mr. F. Bennoch. On this evening Col. Sykes, F.R.S., will preside.

THE SOCIETY'S EXAMINATIONS AND THE LIVERPOOL INSTITUTE.

Following the example of the Leeds Mechanics' Institute, the Directors of the Liverpool Institute have granted to the School Committees the sum of £20 towards the expense of sending up a limited number of pupils, who may pass a preliminary examination, to the Society of Arts' Examinations in June next.

ROYAL JAMAICA SOCIETY OF ARTS.

The exhibition of this Society was opened, at the Museum Rooms, on the 10th ult., by his Excellency the Governor, who made a brief speech on the occasion, in which he announced that Her Majesty the Queen and His Royal Highness Prince Albert had graciously consented to become the patrons of the Society, and had been further pleased to signify their intention of presenting to the funds a donation of £150.

The exhibition comprised, amongst other things, according to the local *Morning Journal*, a machine for preparing arrowroot, invented by Mr. Clarke, head of the mechanical department of the penitentiary. Also an assortment of specimens of Jamaica ornamental and timber woods, which, though by no means so complete as it might have been, fully illustrated the capabilities of the country to furnish woods for cabinet and building purposes. Among these were a few specimens of mahogany, including the feather, bird's-eye, and wavy varieties. There were likewise a curious natural hat-rack, made from the coratœ, or maypole (*Agave Americana*); lithographic stones from the parish of St. George; hats made from reeds; caps, bonnets, and hats, made from the common corn trash, and a cap made from the celebrated lace-bark; soap, in cakes and bars, made in the country; safety matches, used in the blasting of rocks, made from the pith of the coratœ; specimens of fruits, fishes, reptiles, &c., preserved in spirits, and of the yam-bean, from which an excellent starch is said to be made. The Hanover Branch Society contributed dish-mats, made from the wire-grass, and native grown and cured tobacco.

There was a good collection of ores, including a specimen of copper-ore, taken from a 50-fathom cut—thus refuting the assertion that, in Jamaica, copper is only found in bunches on the surface.

In the assortment of fibres were the following:—Adam's dagger, sea-side mahoe, papaw-tree (*netted fibre*), pine apple, penguin, Jerusalem dagger, Manilla plantain, Chinese plantain, broom-weed, down tree (*netted fibre*), bastard or wild mahoe, burweed, West India ochio, silk grass, common turmeric, Indian shot, common daggar, mountain mahoe, banana, mountain cabbage, lace-bark, and the net of the cocoa-nut.

MULTIPLICATION OF BOOKS AND ENGRAVINGS.

Mr. Charles Knight, in his Report to the Board of Trade, on Class 26, Drawing, Printing, &c., at the Paris Exhibition, thus writes on the above subject:—

"I will endeavour to take a rapid view of the new appliances, as shown in the French Exhibition, which afford the probability of ultimate extension of the copying processes, as belonging to books and engravings, as well as those which, originating in imperfect attempts to produce curiosities, have already formed, or are forming, branches of commerce.

"In type-founding, machinery has been introduced instead of the common mode of casting each letter in a separate matrix. In the great French foundries of Plon and of Laboulaye, as well as in others, many ingenious applications are to be seen. In our own London foundries of Caslon, Figgins, and Bezley, as well as in provincial foundries, we have the most beautiful as well as the most useful modern founts. It is in the adaptation to particular classes of printing that we find the practical good sense of our type-founders, as in most other trades. A type of a different character is required for a newspaper than for a book—a type compact, not too fine, very enduring. This quality of sustaining great and constant wear has been accomplished, in types faced with copper or other metal, by the galvanic process. But this beautiful discovery of electrotyping is producing results which stereotyping has never attained. A cast from type metal, from

a woodcut especially, cannot have the sharpness of the original; an electrotype rather adds to the sharpness than diminishes it. The rapidity of the process is also most remarkable in skilful hands. The woodcuts of "The Illustrated News," and of other illustrated papers, are thus duplicated, so as to meet the large demand in a limited time. The large plate of the Austrian types of all languages, thus produced by the galvanic process, was noticed in the Jury Report of the Exhibition of 1851. The same description of plate, with the Calmuck characters added, measuring 540 square inches, was exhibited in 1855. But the Austrian printing-office shows new activity in connection with the capabilities of electrotyping. One of these new processes is called "stilographie." A plane surface is covered with a preparation somewhat like the waxen tablets upon which the ancients wrote. It is composed of two parts of shell-lac and one part of stearine. On this material the draughtsman makes his design with a style. This forms a matrix, from which an electro-type is taken in relief; and from this another plate is taken, which answers the purpose of an incised copper, and is worked at the roller-press. It furnishes a readier mode to the artist than the etching process, but it is scarcely so effective.

"The art called Nature-printing (in German, "Nature-selbstdruk") had not made sufficient advances to be exhibited in 1851. The Austrian printing-office, in 1855, showed to what beautiful and useful purposes it might be applied. The identical reproduction of any natural object—a plant, a feather—by taking its impression on a sheet of lead by an application of cylindrical force, and then producing a galvanic plate which will give impressions of the form, and giving also the colours by separate impressions of the similarly coloured parts, is an onward step in printing which has already taken a commercial shape in England. The admirable plates of Ferns, now publishing by Messrs. Bradbury and Evans, are quite equal to the Austrian examples."

Colonial Correspondence.

SHIPBUILDING IN THE WEST INDIES.

Georgetown, Demerary, 5th March, 1856.

SIR,—Allow me through your columns to draw the attention of the shipbuilders in England to the advantages of building ships in this colony, avoiding, thereby, the intermediate charges. The accompanying sale of six ships' cargoes, sold in Britain, on account of my firm, exhibit:—

Date of Sale in England.	Amount paid by the Purchaser.	Freight paid to the Ship.	Insurance and other Landing Charges.	Amount paid to Producer.	Name of Ship.
1850—Sept.	£ 844 2 8	£ 405 7 3	£ 89 9 6	£ 349 5 11	Gazelle.
1851—May.	1042 16 9	680 11 11	101 9 10	260 15 0	Mohaica.
" Nov.	1229 10 11	573 10 0	129 7 9	526 3 2	Ann Wise.
" Nov.	1279 15 5	644 19 4	141 4 8	493 11 5	Victoria.
1852—Jan.	394 3 6	246 10 2	67 3 6	80 19 10	Aurora.
" Sept.	1617 12 6	849 15 0	204 14 10	463 2 8	Millman.
	6308 1 9	3400 13 8	733 10 1	2173 18 0	

Thus, the purchasers paid in England, £6,308 1 9
The ships received freight, £3,400 13 8

Insurance commission and landing charges amount to 733 10 1

Nett proceeds left for the producer 2,173 18 0

£6,308 1 9 £6,308 1 9

During the years 1848-49-50 and 51, we loaded twenty-three ships with timber for England, but with no better result, still the freights and landing charges continued the same; but since 1851 we have cut and sold a large quantity in the colony at 1s. 7d. sterling per cubic foot for shipment, but as the purchasers grumble at this rate, I am induced to enlighten the shipbuilders on the subject, they paying so much, and the producers getting so little. I think if we could come somewhat closer to each other, the intermediate charges, which fall to the share of the "ship" or the "charterer" (I do not know which, as these vessels are generally chartered for a sum out and home), would reduce the cost of the wood to them, and give us something better. There are on the banks of our rivers immense forests of greenheart, mora, silverbally (a hard wood, considerably lighter than the two first—long, straight, and well suited for planking), souwarie, with natural crooks, locust, wamara, an endless variety of furniture woods, and many soft woods, equal to American pine, the export of which the intermediate charges prohibit.

It may be said that the colony can only furnish the wood required; that the freight out of canvass, iron, nails, rope (bye-the-bye our fibres would come well in for that), &c., would swamp the saving effected on the timber, but outward freight can be had cheap enough, at an infinitely less rate than homeward on an average, for the producer of sugar, as well as the timber shipper, pays the bulk of the charter. However, the purchasers in England can estimate the intermediate charges by what they pay, taking the price of wood in the colony at 1s. 7d.

Timber can be obtained throughout the whole year, and a ship drawing 15 feet of water can load at a distance of 70 miles up the river Demerary, in the very heart of the timber country, and a shipbuilder located there would be possessed of the following advantages:—He would be able to order his wood to the dimensions he wished, from vast forests adjacent to his building dock, natural breast hooks and timbers, which, from their form, no vessel can carry on freight, plenty of "water power" to drive his saws, and the waste wood at present left to rot in the timber paths, would come in for treenails and many other useful purposes. He could depend upon an inexhaustible supply of timber, and by having half-a-dozen competent men from England, to act as foremen, he would be at no loss for labourers, as the creoles are apt hands, and many fine schooners have been built in the colony. The average rate of wages is 4s. per diem for the best hands, and he would get intelligent young hands, *ad libitum*, eager to learn the desirable trade or art of shipbuilding. The climate in the upper parts of the rivers is far preferable to that of Georgetown or the adjacent coast, and well adapted for European constitutions; yellow fever unknown; the beautiful creek water is most wholesome, and affords delightful bathing; the rivers and forests abound in fish and game, are free from mosquitoes that infest the town and coasts.

The cost of permission to cut wood on 500 acres of crown land, is, viz., for a diagram, 100 dollars; Government fees, 136 dollars; in all about £50, with an annual rent of eightpence per acre. I do not profess to have much knowledge of shipbuilding; and there may be objections to building on the spot, which I am unacquainted with; however, should this letter convince the purchasers of our excellent greenheart in England, what a small proportion of the price paid by them falls to the share of the wood-cutter or producer here, it may suggest some plan for their mutual advantage.

I am, Sir, your obedient servant,
LEWIS CAMERON.

Home Correspondence.

THE RIGHTS OF LANGUAGE.

SIR,—Should Mr. Archer ever chance to visit a *pulperia*, or grocer's shop, in Buenos Ayres, Luxan, San Luis, Mendoza, San Juan, Cordova, Tucuman, Salta, Jujuy, or any part of Chilé, and ask for a *maté*, the *pulpéro* will hand him over the counter a gourd, or silver imitation thereof, either full or empty. If he needs the herb, he must ask for *yerva*.

It is quite true that foreigners, *i. e.*, Englishmen and Yankees, call it, and frequently spell it, *mattee*; but this mode of speech is akin to the cockney, "take a pot," or "drain a pewter." The term *yerva maté* is occasionally used by natives, but it means, in that case, *herb for infusion*.

Maté is not a Spanish word, and most provincial words in Southern America are of Indian origin, I therefore judge it to be Indian. A Spaniard calls a pig *puerco*, a Chileno calls it *chancho*.

I am aware how difficult it is to change a name dubbed by commerce, but still an attempt should be made, where practicable, to keep language pure. We call Spanish American dried meat "*jerked beef*." In Spanish it is *charqui*, a corruption from the French *chair cuit*, *i. e.* dried or cooked flesh. A common shopkeeping name in France is *charcutier*, who is usually the sausage man.

We call a thieving long-shoreman on the Western shores of the Atlantic a *filibuster*, who has a very droll etymology. The early boucaniers, or bucaniers, and then buccaneers, *i. e.* literally *bacon-makers*, from drying the wild swine of Tortuga, or Tortoise island, when driven out by the Spaniards, became *freebooters* on the salt water. The French, always in a fix with English pronunciation, smoothed the harsh sound into *filibustier*, the Spaniards into *filibustero*, and the coarser Anglo-Saxon, too blunt to restore it to its original, calls it now a *filly-buster*, and occasionally shortens it into a "buster;" and "go in a fillybustin," is the romance of rowdiness, just as going a philhellening was erewhile the romance of universities.

Chilé, pronounced Chedlay, we obstinately write Chili, and call it Chilly.

Paraguay was a Spanish settlement, and when the infusion travelled over the border into Brazil, it is quite possible that the Portuguese called the herb by the name of the cup, and, if a Spaniard remonstrated with them for it, would be quite likely to "make an ugly face at the enemy," according to their military word of command, and persist in defying the provincial Spanish.

I really must put it to Mr. Archer whether he would be willing to sanction adulterated tea, and, if not, why should he sanction adulterated language? The South Americans are not of the "noble race of Shenkin," but, at any rate, let us leave their fine old bastard Latin uncorrupted by the vulgar abbreviations of Saxon commerce, even though we "civilise themselves from the face of the earth."

Yours faithfully,
W. BRIDGES ADAMS.

THE DEPRECIATION OF MANUFACTURES.

SIR,—Every succeeding paper read on trades and arts within your arena tells us "how shocking bad the articles are now-a-days," and what infamy is practised in their production. I take it that this very much overstated evil is a natural sequence from two circumstances. First, the substitution of middlemen, or distributors, between the producer and consumer—a necessary condition of a highly artificial state of society of dense numbers; and, secondly, the fact that humanity is made up of a few wise men, a considerable number of shrewd men not over conscientious, a very large number of foolish men, and a

great general mass of ignorant men. From time immemorial, the shrewd, unconscientious men have been accustomed to prey on ignorant men and fools. They are the pikes amongst the gudgeons and flat-fish. Pills, and razors, and strops, and shirts, &c., are the baits wherewith they angle, from Packwood down to Morrison. In a dense city, a man buys a cheap article, tempted by apparent saving, and with the inward conviction that if it fails he can get another. In the western woods of the United States, he will take care to purvey him a proven axe, because he cannot there get another. In the days of Robin Hood, the tanner, butcher, or other, purchased his Sheffield whittle, wherewith to flay his "capul hide," direct from the working cutler—mostly to order—so that he got something that really would cut. He was a capable tanner, dealing with a capable whittle-maker, and would probably have exacted the penalty of a fatour whittle-maker's ears for failing in his bargain. In modern times, by the middleman process, this kind of personal satisfaction is out of the question, and the only mode of dealing with the evil is to lessen the numbers of the ignorant by education. Make it a part of their education to judge rightly of the tools and instruments they have to use, and they will know how to select the right ones. Scissors and knives that won't cut can only be regarded as the toys of grown babies. Natural fools will always remain, but when ignorance ceases, the fools will be more under protection, and the unconscientious shrewd men will find that their trade won't pay—that they themselves are only "fools with a circumbendibus." Mr. Wilson could, probably, have given us some curious histories as to the origin of a trade process for keeping up wages, peculiar to Sheffield, called "rattening," for that is part of the business of cutlery—blowing up a mill or boiler with gunpowder as a summary punishment for infringing trade prices.

Personally I have no interest in razors to mow down beards, having learnt from Indians and others how to substitute erasers for them, plucking out and cutting away superfluous hair, but I have been occasionally applied to, in the adjured name of the Virgin, to bestow the power of cutting on a cast-iron razor, with Sheffield mark, and an edge analogous to a corn sickle. It would be curious to find that the adulterators had been adulterated—a Sheffield swindler pirated by a German swindler. There is great pleasure in paying a Jew with a bad sixpence for a warrant—*mori Judaice*—black-lead pencil. I have seen a man shave himself with a French long clasp-knife in preference to an English razor. Your audience was too impatient with Mr. Varley. Walby, the trowel maker, was a conscientious workman, who was formerly an enchanted smith in the imaginations of London bricklayers, who paid 50 per cent. more for the Goswell-street manufacture than for any shop trash. Public house tenders were made to suffer being cut to pieces in wagers by the magic weapons. The producer and consumer met face to face and each was proud of his craft. One of our most noted writers is ever crying out for a pair shoes—real shoes—the like of which are never made now. Shoes of old were made to wear, but now to sell only.

We must bear with our evils. Middlemen and uneducatedness together scoff at conscience. Education will put a bit in the mouth of the middleman, and make him a useful hackney.

CHALYBS.

Proceedings of Institutions.

BEDFORD.—The annual meeting was held on Monday, the 31st ult. Mr. James Wyatt, V.P., occupied the chair, and, having briefly introduced the business of the evening, called on Mr. Coombe, the hon. secretary, to read the report, of which the following is a brief abstract:—After congratulating the members on the favourable position the Institution maintains, the committee express their obliga-

tions to Lord C. J. F. Russell for a lecture at the commencement of the session, on "The Normans and Normandy;" also to the Rev. Emilius Bayley, Incumbent of Woburn (now Rector of St. George's, Bloomsbury), for a lecture on "The Turkish Empire;" to W. K. Norway, Esq., of London, for a lecture on "The Feudal System;" to J. S. Trelawny, Esq., on "The Maxims of Rochefoucauld;" to C. E. Prior, Esq., M.D., for a lecture on "The Food of Man;" to the Rev. E. Goodenough Bayley, for a lecture on "Character;" to the Rev. H. J. Rose, for a lecture on "Genghis Khan and the early Kings of Tartary." Mr. E. Wheeler gave an interesting lecture on "The Curiosities of Insect Life." The library had received much attention during the year, and a very large proportion of income, amounting to £42 8s. 9d., had been expended in the purchase of books of standard value. There was now a good supply of these, in the various departments of literature:—history, biography, science, travels, as well as of the best works of fiction, so that members who availed themselves of its use would find in it alone an equivalent for the full amount of their subscriptions. The fortnightly meetings were resumed at the commencement of the session, and papers were given on "The Life of Oliver Goldsmith," by Mr. Sewell; on "Chemistry, with experiments," by Mr. Sergeant; on "The Plurality of Worlds," by Mr. J. Dixon, jun. Other papers were promised by members, but had been postponed for the present. The formation of a natural history class, free to the members, had been projected, under the direction of the mayor and Mr. Blower. The committee were strongly of opinion that much good would result from the formation of classes in the various departments of science. The want of suitable rooms was the main difficulty in the way. Judging, however, from the friendly disposition evinced towards the Institution by many who had watched its course from the commencement, the committee were of opinion that a vigorous canvass for contributions would be cordially responded to by the public, and the funds necessary for the erection of an appropriate building might be speedily raised. The Institution had conferred most important benefits on the town, and now, in the tenth year of its existence, might be regarded as having passed successfully through its probationary stage. The committee gratefully acknowledged a subscription of ten guineas from William Henry Whitbread, Esq., to the funds of the Institution. To other honorary subscribers the committee expressed their continued obligations. There are now 150 members, of whom 84 are annual, and 66 quarterly subscribers. The income of the Society, during the year, amounted to £135 16s. 8d., and the treasurer, Mr. Thompson, reported a balance in hand of £9 6s. The chairman called attention to the report, and more particularly to that paragraph which suggested a movement for the erection of appropriate rooms. This led to a discussion, and ultimately the matter was referred to the committee for further consideration. A vote of thanks to the secretary and librarian (Mr. Sewell), moved by the chairman, and seconded by the mayor (George Hurst, Esq.), was unanimously carried.

BRECHIN.—The annual meeting of the Mechanics' Institute was held on the evening of Monday, 7th April. Mr. James Smart, President, in the chair. The Secretary, Mr. Picken, read the report of the state of the affairs of the Institution, which showed that the Institution was in full efficiency, ministering in no slight degree to the promotion of intellectual improvement, by placing within the reach of all, the means of acquiring useful knowledge, and of spending their leisure hours profitably and agreeably. During the past year the interest taken in the objects of the Institution has continued unabated. There has been a slight increase in the number of members, the numbers being 370 against 364 last year. The number of life members has been increased by the addition of two names—those of John Chalmers, Esq., of Aldhar, and William E. Baxter, Esq., M.P. The prac-

tice of having the more active business of the session begun with a musical concert, was this year departed from, and, instead, Mr. W. E. Baxter, M.P., gave an address on "Books and Study," which was delivered to a crowded audience, and gave universal satisfaction. The other lecturers were the Rev. William Allan, Arbroath, (1); Dr. Samuel Lawrence, Montrose, (1); Mr. Donnan, Montrose, (1); Mr. William E. Hughes, London, (2); Mr. Dove, Edinburgh, (2); Mr. James A. Campbell, Stracathro, (1); and the Rev. A. Gardner, Brechin, (1). The subjects discoursed on were "Books and Study," "The Electric Telegraph," "The Laws of Health," "Music," "The Black Sea and the Baltic," "The Wild Sports of Scotland," "The Catacombs of Rome," and the "Progress of Civilization in this Country." The directors, with the object of combining amusement with instruction, secured for the members admission at half-price to the musical concert given by the Hungarian band, and to the entertainment of natural magic of Signor Bosco. The library, the department of the Institution that continues to enjoy the largest share of popularity and patronage, is at present in a most flourishing condition. The books, amounting to nearly 3,000 volumes in all departments of science and art, have been in active circulation. The number of readers during the past session has been 340, and the number of volumes issued during the same period has been 6,230, giving on an average 19 volumes to each reader, though some range as high as 80, and some as low as 3 or 4 or even 1. Though books of an imaginative cast, and usually characterised as light reading, have been most in demand, many others, whose study, while requiring more severe application, and more concentrated attention, subserve the important end of strengthening and invigorating the mental faculties, have by no means been neglected. The additions to the library have not been so large as those made last year. To this various causes have combined. The total number of books added to the library during the session has been 61—17 by donation and 44 by purchase. The donors were—Lord Lindsay, the author of "The Lives of the Haldanes" (2 copies), the authors of "The Patentees' Manual," the author of "Rimes and Poems," and the Society of Arts. The newsroom has had during the past session a large number of subscribers, which was to be expected from the stirring events which were then daily transpiring. The report then brought before the members the advantage derived from connection with the Society of Arts, of London, which now has 411 Mechanics' Institutions in union with it. Special reference was made to the scheme set a-going by this Society for granting certificates on examination to members of the Associated Institutions, and thus encouraging and stimulating the formation of classes for instruction. The income of the past year was £111 4s. 3½d., and the expenditure £85 19s. 11d., leaving a balance of £25 4s. 4½d. in the hands of the treasurer.

HUDERSFIELD.—The Monday Class Lectures of the Mechanics' Institution continue to attract large numbers to the reading classes, nearly all of which are held on the Monday night. Recently the adult classes were assembled in No. 6 room, which is about being enlarged, to accommodate the numbers now thronging to it. Here Mr. William Marriott, one of the vice-presidents, gave the first of a series of lectures on the subjects treated in Johnston's "Chemistry of Common Life." Every fortnight, for some months to come, this series of lectures will be continued. To the senior youths, about one hundred of whom were assembled in No. 3 room, Mr. Meikle gave the first of a series of readings from our standard authors. On this occasion the poet chosen was Shakspeare; Mr. Meikle's selections were from the historical plays. The junior classes, which also met in very large numbers, listened with attention to a conversational lecture delivered by Mr. Dore, "On the Early History of the Earth." At the close of his continuous remarks, Mr. Dore began to talk with his hearers as to their remembrances of the facts

brought before them, and their relative connection in their minds. The answers given were prompt and clear, and sometimes racy, too, from the humour with which the idea had been seized, or the Yorkshire idiom in which the thought had been thrust home upon the questioner. —A meeting of the Committee and Teachers of the Mechanics' Institution was recently held in the saloon of the Institution. About two-thirds of the officers were assembled, and from forty to fifty of the teachers. Mr. Edmund Eastwood, the president of the Institution, occupied the chair. The subjects brought before the meeting came before them in the following order:—1. The propriety of obtaining better class books. The president announced that the Irish Society's Arithmetic and Grammar would be introduced, and at so cheap a rate that every pupil in the institution might become a purchaser. The subject next introduced was the classification of the writing classes, a restriction to the use of large and round-hand in the junior class-rooms being the principal point to which attention was directed. The discipline of the school next came under discussion, Mr. Heseltine urging it upon the attention of the meeting, and the president remarking that it was one of his highest sources of satisfaction to find that year by year the teaching of the Institution so directly resulted in an improved tone of morality. Mr. Hiley then introduced the question of forming a voluntary teachers' class, which he warmly advocated, the secretary explaining that the specific object of the class was to obtain, whenever it was possible, better modes of teaching. A resolution, requesting the committee to form such a class, moved by Mr. Heaton and seconded by Mr. T. Berry, was carried unanimously. The possibility of forming a class for the special study of natural philosophy next succeeded as a topic for discussion, and there is little doubt that the ground is now fairly broken, and at no very distant time such a class will be inaugurated under the auspices of the working men themselves, bringing their home-made apparatus. The raising, upon the present school of the Institution, a higher school, was then discussed. It was stated that the advanced drawing-class might at once form part of the high school. The class, from the character and number of the drawings required, was a costly one, and there was no objection on the part of the pupils to contribute to the expense. A small fee would be cheerfully paid by them. The president remarked that the plan had been adopted in the French class with perfect success, increased numbers and regular attendance resulting. The president then invited the attendance of the teachers to a very important subject, the present crowded state of the class-rooms; and it appeared to be the general impression that such an addition would be necessary as would necessitate an appeal to the public for aid.

LONDON.—The first annual meeting of the Camden Literary Institution was held on the 25th ult., and was presided over by M. A. Garvey, Esq., LL.B., one of the vice-presidents. The meeting was numerously attended, and the entertainments, which comprised both literary and musical variety, passed off most satisfactorily. The chairman gave an interesting description of the process of Nature Printing, illustrating his remarks by exhibiting specimens of the plates employed in the process and impressions taken from them, kindly lent by Messrs. Bradbury and Evans, together with specimens belonging to the Society of Arts, also lent for the occasion. At a later period of the evening a short address, on the Microscope, was given by John Gamgee, Esq., medical lecturer at the Institution, who created a fund of amusement by exhibiting three powerful microscopes in one of the class rooms. Miss Poole, Mrs. A. Gilbert, Mr. Geo. Tedder, Mr. Fred. Chatterton, Mr. Henry Baumer, Mr. Aylward, Mr. W. Dawson, and Master Haynes, kindly gave their musical services, and elicited marked applause. Several rooms were decorated with paintings, contributed by Fred. Goodall, Esq., A.R.A., Geo. Lance, Esq., Geo. Cruik-

shank, Esq., J. Absolon, Esq., and others, also with some beautiful photographic portraits, exhibited by Messrs. Aglio and Absolon, of Piccadilly, and Mr. Mayall, of Regent-street. The London Stereoscopic Company contributed an interesting collection of stereoscopes and slides, and Mr. Geo. Gray, and Mr. F. C. Partington, lent several working models. The committee report favourably of the prospects of the Institution. The numbers continue to increase, the lectures, reading-room, and classes are well attended, and the library, though small, is well used. Of course the committee need encouragement and co-operation; they are, however, gratified at having hitherto met with both beyond their expectations.

TUNBRIDGE.—The annual general meeting of the Literary Society was held on Monday, the 7th instant, Major Scoones, the president, in the chair. The secretary, Mr. Snelling, read the report, containing a statement of receipts for the year ending 31st March last, amounting to £107 18s. 8d., and the expenditure for the same period, £105 15s. 8d., thus leaving a balance in the hands of the treasurer of £2 3s. 0d. It was also reported that the lecture account for the season showed a balance in favour of the Society. The number of books in circulation from the library amounted to 1,049 in the course of the year. The following gentlemen were appointed to form the committee for the ensuing year, viz., Messrs. Biggs, Bartram, Headland, Ellis, Kirkland, Gregory, J. Smith, Wibmer, and Calvert. The meeting separated with a vote of thanks to the chairman.

PARLIAMENTARY REPORTS.

SESSIONAL PRINTED PAPERS.

Delivered on 3rd April, 1856.

Par. No.

41. Local Acts (20, Kirkwall Harbour Amendment; 21, Inverness and Aberdeen Junction Railway; 22, Morayshire Railway; 23, Middlesbrough Extension and Improvement)—Admiralty Reports.
85. St. James's Park—Report from the Committee.
- 90 (5). Civil Services Estimates—Class 5.
113. Highland Roads and Bridges—42nd Report of the Commissioners.
75. Bill—Reformatory and Industrial Schools. National Education (Ireland)—21st Report of the Commissioners, Vol. 2. Census of Ireland for the year 1851 (Ages and Education)—Part 4. Major-General Williams—Fac-simile of the Superscription of a Letter by Shukri Pasha. *Delivered on 4th April, 1856.*
91. Civil Contingencies—Account and Estimate.
121. Factories—Copy of Instructions.
132. House of Commons' Offices—Copy of a Treasury Minute.
77. Bills—London Corporation.
79. Bills—Public Works.
80. Bills—Public Works (Ireland.) Statistical Abstract of the United Kingdom from 1841 to 1855. Education—Minutes of the Committee of Council. *Delivered on 5th and 7th April, 1856.*
114. Irish Reproductive Loan Fund—Account.
116. British Spirits—Returns.
118. Banks of Issue—Return.
119. County Court Judgments, &c.—Return.
125. Enfield Factory—Return.
127. Education—Copy of Minute, Dated 26th January, 1856.
130. Immigrants and Liberated Africans—Return.
131. Church Affairs (Canada and Victoria)—Correspondence.
108. Mr. L. H. Evelyn—Copy of Correspondence, &c.
123. Convicts (Ireland)—Returns.
135. Exchequer Bills—Account.
136. Committee of Selection—4th Report.
62. Bills—Tithe Commutation Rent charge.
63. Bills—Adwosons (a corrected copy).
76. Bills—Courts of Common Law (Ireland) (amended).
81. Bills—Leases and Sales of Settled Estates.
78. Bills—Scotch and Irish Pauper Removals.
82. Bills—Joint Stock Banks.
85. Bills—Fire Insurances.
86. Bills—Bankers Compositions. Turnpike Trusts—2nd Report by the Secretary of State. Prisons—17th Report of the Inspectors (Home District) Part 1. Prisons—18th Report of the Inspectors (Home District) Part 1. *Delivered on 8th April, 1856.*
111. Increase and Diminution (Public Offices)—Abstract of Accounts.
120. Board of Manufacture (Scotland)—Papers.
126. Military Aid to Civil Power—Returns.
128. Poor Law (Birmingham and Aston)—Report by R. Weale, Esq.
87. Bill—Joint Stock Companies (as amended in Committee and on Re-commitment). Charity Commission—3rd Report. *Delivered on 9th April, 1856.*
41. Local Acts (24, Stotfield and Lossiemouth Harbour; 25, Stockton and Middlesbrough New Turnpike Road and Bridge)—Admiralty Reports.
115. Expiring Laws—Report from Committee.
117. New Palace (Westminster)—Correspondence.
137. Bank Notes—Copy of Treasury Minute.
83. Bills—Specialty and Simple Contract Debts.
88. Bills—Bankruptcy (Scotland) (amended).
89. Bills—Drafts on Bankers (amended).
92. Bills—Partnership Amendment (No. 2). Prisons—21st Report of the Inspectors (Scotland) Part 4.

MEETINGS FOR THE ENSUING WEEK.

- MON.** London Inst., 7, Dr. Lankester, "On the Recent Progress of Vegetable Physiology." Architects, 8. Geographical, 8½, 1. "Letter to the Secretary from Dr. Sutherland, Natal, South Africa;" 2. "Later Accounts respecting Dr. Livingston, and Return Route of the Arab Merchants across Africa;" 3. Mr. Thomas Hopkins, "On Certain Arid Districts and the Causes of their Dryness."
- TUES.** Royal Inst., 3, Mr. T. H. Huxley, "On Physiology and Comparative Anatomy." Civil Engineers, 8, Discussion upon Mr. Drysdale's paper on "Steep Gradients of Railways, and the Locomotives Employed." Linnæan, 8. Pathological, 8.
- WED.** Society of Arts, 8, Mr. F. Bennoch, "On Thread or Fibre Gilding." Entomological, 8½.
- THURS.** Royal Inst., 3, Prof. Tyndall, "On Light." Antiquaries, 8. Royal, 8½.
- FRI.** Royal Inst., 8½, Dr. H. Bence Jones, "On Ventilation, and the Means of Determining its Amount."
- SAT.** Asiatic, 2, Mr. C. P. Brown, "On the Present State of the Hindu Population of India, with some Notice of the Mahomedans." London Inst., 3, Mr. E. W. Brayley, "On Geology." Royal Inst., 3, "Dr. A. W. Hofmann, "On the Non-Metallic Elements; their Manufacture and Application." Medical, 8.

PATENT LAW AMENDMENT ACT, 1852.

APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

[From Gazette April 4th, 1856.]

- Dated 22nd December, 1855.*
2899. John Gedge, 4 Wellington-street South, Strand—Improvements in cutting and folding paper to form letters or notes and envelopes in one piece. (A communication.) *Dated 14th February, 1856.*
377. John Conrad Meyer, Paris—Improvements in machinery for rolling metal. *Dated 27th February, 1856.*
501. William Holden Jennings, Birmingham—Improvements in the manufacture of the guards and heel plates of guns, which improvements may also be applied to the manufacture of lasso rings and manillas. *Dated 1st March, 1856.*
537. François Rualem, 29, Rue de Paris à Belleville, France—Improvement in the manufacture of fuel. *Dated 4th March, 1856.*
550. Charles Thomas Rosenberg, 12, Clarence-terrace, Camberwell New-road—Improvements in ornamenting china, glass, and other surfaces, when transferring printed impressions. *Dated 17th March, 1856.*
634. George Hills, Belmont-hill, Lee—Improvements in treating fatty and oily substances so as to obtain stearine and oleine in separate states.
638. James Amos, Frindsbury, Kent—Improved flour dressing machine.
638. Robert Thomson, Glasgow—Improvements in weaving. *Dated 18th March, 1856.*
640. Peter Armand le Comte de Fontainemoreau, 39, Rue de l'Echiquier, Paris—Improvements in churns. (A communication.)
642. Thomas Bird and Thomas Rose, Manchester—Improvements in castors.
644. Edwin Pettitt, Manchester—Improvements in machinery for preparing cotton and other fibrous substances.
648. William Smith, 10, Salisbury-street, Adelphi—Improvements in the means of economising heat in locomotive engines. (A communication.) *Dated 19th March, 1856.*
651. Richard Morgan, Acton—A cellular purse.
652. Thomas Richardson and George William Jaffreys, Hartlepool—Improvements in marine steam-engines.
653. Augustus Dacre Lacy, Hall-house, Knavent, near Thirsk—Improvements in certain apparatus for taking up and delivering mail bags and other packages from a railway carriage or carriages whilst the train is in motion.

654. Barnet Solomon Cohen, 9, Magdalen-row, Great Prescott-street—Improvement in the manufacture of chimney pieces, shop fronts, pillars, pilasters, slabs, vases, and ornamental parts of buildings.
655. John Davie Morris Stirling, Blackgrange, Clackmannanshire, N.B.—Improvements in steel and its manufacture.
656. Barnet Solomon Cohen, 9, Magdalen-row, Great Prescott-street—Improvement in the manufacture of pen-holders, handles, knobs, finger-plates, and umbrella and parasol furniture.
657. Ely Smith Stott, Halifax—Improvements in the manufacture of mohair, alpaca, and worsted pile fabrics.
658. David Cope, Birmingham—Improved manufacture of spoons, forks, and ladles.
659. Alfred Vincent Newton, 66, Chancery-lane—Improved means for separating substances of different specific gravities. (A communication.)
660. John Bishop Hall, New York—Improvements in preparing and treating pictures.
661. Charles Frederick Parsons, Lambeth—Machinery to be employed in the bleaching and dyeing of cloths, yarns, and fabrics.
662. Richard Archibald Brooman, 166, Fleet-street—Improvements in balance slide valves. (A communication.)
Dated 20th March, 1856.
663. John Leighton, 40, Brewer-street, Golden-square—A luminous fire-place and self-supplying smoke consumer.
664. Peter Armand le Comte de Fontainebleau, 4, South-street, Finsbury—Improvements in looms for weaving. (A communication.)
665. James Wadsworth, Hazelgrove, near Stockport—Improvements in the ventilation of mines, or in the means of removing noxious gases therefrom, and in machinery or apparatus to be used for that purpose.
666. John Watson Burton, Eye, Suffolk, and George Pye, Ipswich—Improvements in treating flax, hemp, and other fibrous matters requiring like treatment.
667. William Charles Theodore Schaeffer, Bradford—Improvement in treating soap-suds and wash-waters.
668. John Davie Morris Stirling, Blackgrange, Clackmannanshire, N.B.—Improvements in mounting heavy ordnance for naval purposes. (A communication.)
669. John Trueman, 34, Castle-street, Belfast—Improvements in ovens for baking.
670. William Drummond, Smith-street, King's-road, Chelsea—Improvements in spring hinges for swing doors.
Dated 22nd March, 1856.
671. James Murphy, Newport—Improvements in means or apparatus for stopping or retarding vehicles used on rail or other roads, which improvements are also applicable to the brake wheels in connection with stationary engines.
672. George Henry Brookes, Dalkeith—Improvements in stoves, grates, or fire-places.
673. William Brierley and James Platts Brierley, Cleckheaton—Improvements in looms for weaving.
674. Walter Glover, Salford, near Manchester—Improvements in the construction and arrangement of machinery or apparatus for damping and beetling woven fabrics.
675. Henry Pratt, Worcester—Improvements in the construction of union mills, and in the application of the motive power apparatus, and machinery connected with the manufacture of flour and bread, parts of which are also applicable for other useful purposes.
676. James Septimus Cockings, 36, Ann-street, Birmingham—Improved envelope, and which said envelope he proposes designating as the despatch or return envelope.
677. John Henry Johnson, 47, Lincoln's Inn-fields—Improvements in weaving by electric power, and in the machinery or apparatus employed therein. (A communication.)
678. John Jones and Alexander Cunningham Shirreff, Glasgow—Improvements in the construction and application of rotary motive power engines and pumps.
679. John Henry Johnson, 47, Lincoln's Inn-fields—Improvements in electro-magnetic printing telegraphs. (A communication.)
680. Henry Brierley, Chorley—Improvements in self-acting mules for spinning and doubling.
681. John Hinks and George Wells, Birmingham—Improvements in metallic pens and pen-holders.
682. Gustav Georg Anton Ludwig Michael Schelhorn, Birmingham—Improved pen-holder.
683. Charles Carey, 32, Union-grove, Wandsworth-road—Improvements in shower baths.
685. Charles Carey, 32, Union-grove, Wandsworth-road—Improvements in the vessels and filters used for making infusions of coffee and other substances.
686. John Jukes, Dame-street, Islington—Improvements in furnace bars.
687. Charles Carey, 32, Union-grove, Wandsworth-road—Improvements in presses for copying letters and other documents, and for other uses.
688. Edmund Barber, Tring, Hertfordshire—Improvements in mangles.
Dated 24th March, 1856.
690. Thomas Heaton, Blackburn—Improvements in self-acting doors and gateways.
691. James Bryant jun., Plymouth—Improvements in machinery or apparatus for the re-burning of animal charcoal.
692. James Robertson, Ardrossan—Improvements in transmitting motive power.
694. Peter Brown and George Brown, Liverpool—Improved ash-pan for fire-grates.
695. Richard Husband, Manchester—Improvements in the manufacture of hats.
696. John Tysoe, Charles Tysoe, and Peter Foxcraft, Salford—Improvements in machinery or apparatus for roving, spinning, and doubling cotton and other fibrous substances.
697. William Pitt and Edwin Turner Davies, Birmingham—Improvements in the manufacture of brackets and castors for furniture.
698. William Clay, Liverpool—Improvements in the manufacture of wrought or bar iron.
699. William Edward Newton, 66, Chancery-lane—Improved coupling for connecting carriages, locomotives, and all vehicles used on railways. (A communication.)
700. William Edward Newton, 66, Chancery-lane—Improvements in cranes. (A communication.)
Dated 25th March, 1856.
701. Robert Caunce, Bolton-le-moors—Improvements in the machines for spinning called 'mules.'
703. Louis Antoine Gizard, 33, Rue de l'Echiquier, Paris—Improvements in elastic mattresses and cushions.
705. William Forster, Black Dike Mills, Bradford—Improvements in looms for weaving.
707. John Dearman Dunscliff, Nottingham, and Stephen Bates, Radford, Nottingham—Improvements in the manufacture of twist lace and weavings.
709. James Hargraves, Woollen Works, Carlisle—Improvements in the apparatus used for dyeing fabrics.
711. William Ball, Chicopee, Hampden, U.S.—Improvements in machinery for stamping ores.
713. William Illingworth, Manchester—Improvements in printing or colouring china, earthenware, or other ceramic manufactures, and in the machinery or apparatus connected therewith, and also improvements in the subsequent treatment of such manufactures.

INVENTION WITH COMPLETE SPECIFICATION FILED.

739. Constant Jouffroy Duméry, Paris—Improvements in smoke-preventing apparatus.—27th March, 1856.

WEEKLY LIST OF PATENTS SEALED.

- Scaled April 4th, 1856.*
2230. Thomas Dickens.
2242. John Hubbard.
2250. Joseph Gilbert Martien.
2265. Denis Hébert.
2282. Thomas Moore.
2318. Jules Hyppolite Clément.
2334. John Wakefield.
2340. John Davie Morris Stirling.
2354. Thomas Valentine and Daniel Foster, and Giles Haworth.
2400. John Davie Morris Stirling.
2642. John Pursloe Fisher.
2662. George Edward Dering.
2795. John Horsley.
2797. John Henry Johnson.
2886. Louis Rudolph Bodmer.
2910. Frederic Holdway.
288. John O'Meara Beamish.
312. Francis Montgomery Jennings.
- Scaled April 8th, 1856.*
2266. Thomas Oddie, William Lancaster, and John Lancaster.
2274. William Bayley and John Quarmlby.
2306. Enrico Angelo Ludovico Negretti and Joseph Warren Zambra.
2308. George Thomson.
114. William Prangley.
- PATENTS ON WHICH THE THIRD YEAR'S STAMP DUTY HAS BEEN PAID
- April 1st.*
872. Richard Archibald Brooman.
- April 2nd.*
801. William Walker.
1020. James Andrew Bruce.
- April 3rd.*
804. Charles May.
826. Henry Alfred Jowett.
- (Omitted from Journal of 28th December, 1855.)*
December 20th, 1855.
1161. George Bower.
839. Robert Pattison Clark.
- April 4th.*
842. Christopher Nickels.
880. François Félix Verdié.
- April 5th.*
852. George Herbert.
853. Joshua Farrar.
887. George Elliot and William Russell.

WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

No. in the Register.	Date of Registration.	Title.	Proprietors' Name.	Address.
3824	April 3.	Frame or Stand of a Mill.....	Ransomes and Sims	Ipswich.
3825	April 8.	The "Carlisle" Morning Coat	{ Edward Smith and Sons } { Joseph Smith and Sons }	Leeds.